Industry scientist discusses statistical approach to safety testing

By Cathy Sprankle and Tom Burns

Jaworska is recognized as a leading authority on developing the next generation of adaptive, integrated testing strategies for skin sensitization. (Photo courtesy of Joanna Jaworsky)

Manufacturers test cosmetics, household cleaners, and other chemical products before marketing, to identify any hazards they might present. One of those hazards is skin sensitization, or the potential for a product to cause an allergic skin reaction. The National Toxicology Program (NTP) Interagency Center for the Evaluation of Alternative Toxicological Methods (NICEATM) *(http://iccvam.niehs.nih.gov/about/about_NICEATM.htm)* is studying new methods to test substances for skin sensitization hazards, and in May hosted a visit from a leading industry scientist to collaborate on development of a promising new testing approach.

Linked Video

Watch Jaworska's keynote address, "Integrated testing strategies — opportunities to better use existing data and guide future testing," at the Center for Alternatives to Animal Testing workshop in 2010 on "21st Century Validation Strategies for 21st Century Tools" (01:15:00).

Joanna Jaworska, Ph.D., *(http://reach.setac.eu/programme/about_the_speakers/?contentid=73#Joanna_Jaworska)* a principal scientist with Procter and Gamble in Brussels, Belgium, visited NIEHS May 20–21. While at NIEHS, Jaworska presented a seminar titled "Bayesian Integrated Testing Strategy to Assess Skin Sensitization Potency: From Theory to Practice," and met with NICEATM and other NTP scientists to work on creating an integrated testing strategy to identify potential skin sensitizers using non-animal test methods.

Preventing allergic contact dermatitis

Regulatory agencies around the world require testing to identify substances that may cause allergic skin reactions. Repeated exposure to these substances can cause allergic contact dermatitis (ACD), a skin condition characterized by redness, swelling, blistering, and itching. Poison ivy is a well-known cause of ACD, but chemicals that are used in consumer products, such as formaldehyde and nickel, can also cause the condition. ACD is hard to treat, so it is important to identify and properly label substances that may cause it. With proper labeling, people handling these substances have the information they need to prevent exposure.

Traditional testing methods to identify substances that cause ACD use animals, but concerns about testing efficiency and animal welfare are driving efforts to replace traditional testing methods with non-animal methods. In practice, it usually takes several non-animal tests to provide the same level of information as a single animal test.

Moving toward alternative testing

The integrated testing strategy developed by Jaworska and colleagues at Procter and Gamble provides an approach for analyzing information from non-animal tests and other information about a test substance, such as chemical structure and solubility. The analysis considers all the available relevant information about a substance and produces a numerical probability that the substance is a sensitizer. This probability could potentially be used to make decisions about whether substances require hazard labeling, without requiring animal testing.

The software used by Procter and Gamble for these analyses is patented, so Jaworska and the NTP scientists are collaborating to develop similar tools using free, publicly available software, to make the integrated testing strategy approach more widely available. "If our collaboration is successful, people and organizations worldwide will be able to use this approach for identifying potential sensitizers," commented NTP senior toxicologist Warren Casey, Ph.D., acting director of NICEATM. "It's an example of how international cooperation can support the effort towards eliminating animal testing in this area."

(Cathy Sprankle and Tom Burns are employees of ILS Inc., support contractor for NICEATM. Sprankle is senior communications specialist and Burns is a senior project coordinator/technical writer.)

The Environmental Factor is produced monthly by the National Institute of Environmental Health Sciences (NIEHS) *(http://www.niehs.nih.gov/)*, Office of Communications and Public Liaison. We welcome your comments and suggestions. *(bruskec@niehs.nih.gov)*

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